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ABSTRACT

A method for resolving range ambiguities and separating overlaid signals in a Doppler weather radar is proposed. For uniform PRT transmission, it consists of a special deterministic code for phases of the transmitted pulsed, and associated decoding and processing of return signals. In the decoding process when the signal from one range interval is made coherent, the signal from the other range interval has a multiple split spectrum. The multiple spectra have the same shape but are offset from each other. Processing steps to separate the overlaid signals and a procedure to estimate the spectral moments are given. One crucial aspect in this procedure is the magnitude domain deconvolution. The magnitude domain deconvolution is also applied to a staggered PRT transmission scheme whereby it enables the estimation of spectral parameters with much lower standard error than the known methods. Moreover, the magnitude domain deconvolution combined with special spectral processing solves the outstanding problem of ground clutter filtering in the staggered PRT sample sequence.